

Dynamic-programming MPC for a single-zone building over a daily horizon

Consider the discrete-time state-space model

$$x_{k+1} = f_k(x_k, u_k, d_k),$$

with

$$y_k = g_k(x_k, d_k),$$

where:

- $x_k \in \mathbb{R}^{n_x}$ is the building state, including, for example, indoor air temperature and wall temperatures;
- $u_k \in \mathcal{U}$ is the control input, with $\mathcal{U}$ a finite set;
- d_k contains known or forecast disturbances, such as outdoor temperature and solar irradiance: